Alternative Paradigms

by Matt Faunce *(draft 7/4/11)*

I. The Steps to Knowledge

> The elements of every concept enter into logical thought at the gate of perception and make their exit at the gate of purposive action; and whatever cannot show its passports at both those gates is to be arrested as unauthorized by reason.
>
> —Charles Sanders Peirce[1]

The three initial steps to knowledge are Sensory Perception, Action, and Inference.* Then, the evidence for a correct inference is the successful actions based on that inference.

Sensory Perception: Our initial source of knowledge is through our five senses. Our sense organs, viz., eyes, ears, nose, tongue, and skin, relay to our mind the sensory effects which are so far unorganized by our reason.

Action: We are born with pre-programmed biological needs and desires which whether satisfied or not by our action will cause a good or bad feeling. The impetus for action is the will to satisfy our needs and desires. Only through assessing the success of action do we understand anything about the sensory effects. Ex. 1, A man who was blind from birth until mid-life, and finally gets his sight restored, has no understanding of the objects of his vision until he makes use of them. Ex. 2, When I was an infant I felt a bad feeling in my stomach, so from instinctive impulsion I wiggled my arms, scrunched my face, rocked back and forth on my back, I cried, I did everything I could do in no particular order, then my mom fed me and the bad feeling went away. Later, that feeling came back but more mildly, and again I had an impulse to act. So I scrunched my face and wiggled my arms, to no avail. So I cried, and my mom fed me. Eventually I learned that crying is the way to get rid of that bad feeling. Ex. 3, A baby is feeling cold and unpleasant then his mother moves him close to a fire, which warms him up. After this happens a few times he determines that the movement was responsible for the good feeling. Further experience narrows down what part of that motion made it good, viz., motion toward the fire. Fire as a distinct object is only known through an inferential judgement. Thinking of my mom as a separate being was only known through an inferential judgement.** Action before inference is like fumbling in the dark in a completely unfamiliar place. There is a lot of trial and error, and some luck.

Inference: With experience, inferences about the object can be made. The most basic inference is the initial judgement of delineating sensory effects into desirable and undesirable objects, ex., the baby delineates the effect of fire from the effects caused by the rest of his surroundings and determines it is an object that causes warmth. Desirable effects become

usable objects. From here, action can be better directed. Ex., now you can purposively move toward the fire to get warm. A second level of inference is when you can identify something by its sign. Ex., when I see smoke in the hills, I hike up closer to the source and see fire, and then associate this smoke with this fire. Further experiences, plus corroboration with other people's accounts, confirm that whenever there is smoke there is, or was, fire. Another form of inference is by relating an unexperienced object with an experienced one you can understand it. Ex., you've never tasted frog legs before but you believe me when I say they taste like chicken. The better developed your inferential skills are the better you will direct your action, and the more successful you will be in satisfying your needs and desires.

Successful action is the litmus test for a genuine idea. No action could be taken regarding bogus ideas like a four sided triangle, or two halves of a mathematical point. But, every genuine idea has, or can be reasonably predicted to have, practical bearing. Ex., you can figure out the area of a triangle, and you can divide a line with a point. Be careful, a bogus idea might simply be a misnomer for a genuine one, ex., a four sided triangle probably means quadrilateral; and two halves of a point probably means two halves of an area. Conversely, "curved space" was considered a bogus idea for centuries until Einstein found a use for it, but if someone before or after Einstein had a conception of curved space with no use for it then his particular conception of it was bogus. Any idea that has no conceivable purpose is a bogus idea.

In How to Make Our Ideas Clear, Charles Peirce wrote "[T]he whole function of thought is to produce habits of action." In this article he parses this idea over several paragraphs. It can be summarized as follows. You have the agitation of doubt; then thought is activated to produce a belief of how to act to quell that doubt; if the action works, a habit of action is formed and as long as the action continues to work you won't have that particular agitation again. Habits of action allow us to attend to higher level problems. Ex. 1, a well trained musician doesn't have to think about technique while performing. When younger, it was essential to focus on technique most of the time, even while performing. But, any attention to technique while performing is detrimental to interpretation. So it's essential to get a good technique into your rote memory. Ex. 2, we don't have to think about how to hold a pencil every time we write. ⁂

II. Conception of Objects and Ideas

In 1877 A.D. Charles Sanders Peirce wrote an article which spawned the philosophical school of pragmatism. In this article, How to Make Our Ideas Clear, he wrote what came to be known as the pragmatist maxim:

> Consider what effects, which might conceivably have practical bearing, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object.

Like the baby delineated the warmth of the fire from the other effects he perceived, and then conceived the dancing light as an 'object of warmth', what we call objects are the effects we feel and understand in relation to our needs, desires, and actions. Other effects that are invariably associated with the desired effect help us identify the object. The dancing light was the sign by which the baby identified the warmth before he felt it. Our conception of something isn't formed by a direct transmission from object to understanding—it must go through the process of perception, action, and inference. Our conception of something is composed of the perceived, inferred, felt and conceivable effects of the object or idea. A person who perceives more of, or understands more about, the object's effects has a better conception of it than the person who perceives or understands less. Further perceptions and actions allow us to infer more about the the same object, which gives us an even better conception of it.

Do subjective preferences to certain effects alter your conception? In other words, if two people have the same perception and understanding of an object but each person has different favorite or disliked effects of it, that is, if they weigh the effects differently, do they have different conceptions? I'll answer both ways.

No. Two people who have the same perception and understanding of an object have the same information about the object. A feeling about it is something apart from the conception of the object. Weighting one particular effect is like focusing on one part of a picture—your attention may gravitate toward that one part, but you still are fully aware of the whole picture.

Yes. Preferences are the desire for a feeling which is an effect of an effect of the object. Just like a delineation in the manifold of sensations is a judgement, any delineation in the causal chain can be judged to be one thing. That is, primary and secondary effects can be considered one aggregate effect. Weighting an effect is like enlarging one part of a picture—that enlarged part changes the dimensions of the picture.

The former answer reverts to the assumption that a conception comes from a direct transmission from object to mind. No effect is "apart from" the conception of an object; effects define the object. This includes conceivable future effects, and effects of those effects. Ex., your conception of a new gun is based much on what it could do, plus all the subsequent consequences you imagine. If your loved one died from a stray bullet, the conceivable effect of death the new gun carries weighs more heavily with you than someone who only has never felt that effect. The effect you feel from conceiving an accidental death from the gun is qualitatively different than the other person's effect when conceiving the same event—this secondary effect is a part of your conception of the gun. Because a conception of anything is feeling-dependent, and feelings vary, however slightly, by the moment, a conception of something is a floating conception, that is, always changing with time.

Our conception of every object and idea can be clarified by asking these two questions:

1. What are its past, present, or potential effects? The known effects are what our volition (will to act) refers to in order to either make use of the effects or avoid the effects.

2. What is the difference between it and any similar thing or idea? This question is to avoid confusing different names of the same thing for different things. If two things or ideas refer our actions or any potential action to exactly the same thing or idea, then these two words or ideas are synonyms. This question is also useful in understanding the shades of variety in a universal concept, or category; or whether something fits into a certain universal. Ex., all pencils have some difference from each other but all are called pencils. And, a pen isn't a pencil, but all pens and pencils are writing utensils.

Peirce, in How to Make Our Ideas Clear:

> ... Whether we ought to say that a force *is* an acceleration, or that it *causes* an acceleration, is a mere question of propriety of language, which has no more to do with our real meaning than the difference between the French idiom *'Il fait froid'* and its English equivalent *'It is cold.'* ...
>
> [It was] stated that we understand precisely the effect of force, but what force itself is we do not understand! This is simply a self-contradiction. The idea which the word force excites in our mind has no other function than to affect our actions, and these actions can have no reference to force otherwise than through its effects. Consequently, if we know what the effects of force are, we are acquainted with every fact which is implied in saying that a force exists, and there is nothing more to know. ...

III. Identity of Cause and Effect

In all particular cases, when we refer to a cause we refer to the effect of the cause, therefore cause and effect are identical.

Objection: Cause is not the same as effect. "Matt, by rubbing two sticks together, caused a fire" is not the same as "Matt is the fire."

Answer: The ideas in this objection need to be clearer.

The subject: Matt, did not by himself cause the fire—other elements, like the interaction of oxygen, were also in play. To put it more accurately, the cause was a confluence of elements at the start of the fire, of which Matt was a part; and then a confluence of elements continued the fire, when Matt was not needed. So it would be correct to say "The totality of interacting elements that caused the fire to start is the start of the fire." There is nothing more or less you

could refer to as the start of the fire. You can't refer to the spark because that is the fire after the start; and you can't refer to the wood, oxygen, etc., because that is before the start. You must include all, and only, the interacting elements and forces at the start of the fire.

The predicate: the fire, is generally thought of as an ongoing phenomenon, i.e., the continuation after the start. Our conception of fire comes from its effects, viz., heat, light, color, motion, the consumption of a substance, etc. So we can say "that combination of heat, light, color, motion, the consumption of a substance, etc., is fire." The cause of the continuation is different than the cause of the start. We can delineate a specific moment in that continuation and say "The totality of the specific interacting elements that caused that moment of fire was that moment of fire."

To consider what precedes the effect is to consider something other than the original object of our conception. Matt going to the campground, getting cold, gathering wood, the wood getting hot from rubbing two pieces together, etc., may be considered as parts of the chain of events leading up to the fire, but each segment of time and place has an effect that is something other than fire. Each one of these effects is a new cause. This is the unbroken, continuous, chain of causation which leads up to what we conceived as the cause of our fire, but none of these segments by themselves can be considered as a cause of the fire. You can consider them as building blocks to the cause, but 100% of what is needed to produce the effect is there at the moment of the effect; that is, the moments preceding the moment at the effect cannot overlap that moment in order to produce the effect."[2]

An object is constantly changing. Molecular and atomic motion is continuous, so to accurately define our object we suppose we must freeze it in time. What comes after this moment is different at every division of space within the object than what was before. For our rough purposes the thing works just the same so we think of it as the same, but from a microscopic perspective it is different. But a moment in time is not possible to conceive. We suppose our language and conceptual ability is exact, but a conceptual moment runs into the problem illustrated by the following examples. Ex. 1, we can conceive a baseball moving toward a window, and we can conceive a cracked window, but we can't conceive the first moment of crack. Likewise, we can't conceive a single moment of any object. Ex. 2, when two billiard balls collide, is the first moment of contact at a point or an area? It can't be a point because a point is a mathematical device for dividing a line and takes up no space, i.e., there is no material that takes up the space of a point. It can't be an area because this assumes two or more spots within the area touched simultaneously, which is impossible. In classical physics, you would narrow time down toward infinity and you would eventually see one spot touch before the other, but then you again have two halves of that spot. In quantum mechanics it leads into Planck-Wheeler space-time[3] which isn't fully conceivable. The theory works to some extent, but quantum mechanics is still in its infancy and needs to be developed. There is no such thing as a perfect conceptual snapshot with which we can define an object. Of course this isn't a problem since I've already shown that our conception of something

comes from uses we conceive it has rather than a picture of it. (One use is aesthetics.)

In any change, there is an association between the old state of being and the new, but there is no causal mechanism, or agent between the two. Ancient Indian philosophers coined a phrase for causation, "This being, that becomes."[4] But because that seemed too mysterious or incomplete, a search for a causal mechanism continued. This search was not only futile because of the inevitability of dividing the time taken by the mechanism *ad infinitum* trying to find the last efficient moment causing the new state, but more importantly, any idea of an agent of cause is superfluous to any possible practical matter! Science determines what elements and relations are invariably associated in time and space for certain events to happen, and this is all that is needed to recreate experiments or to predict when events will happen. An understanding of a causal agent could add no new practical knowledge. An association of old and new is all that is necessary. Ex., when a baseball flies into a window at 70 m.p.h. (relative to the window) and breaks it, the elements right before the moment of the break are a baseball and a brittle window plus their relative velocities*** toward each other. This is an equation, not a mechanism of cause. Direction and velocity define the relation between the two, just like an addition or subtraction sign. Does 2+3 cause 5? Not if cause is considered a mechanism. 2+3 is 5. What changed was their relation. (2 is the ball; 3 is the window; + is their relation, i.e., their direction and velocity; 5 is their new collective state, which was a direct consequence of their old states and relations.) Causation is simply explained as "this being, that becomes." Again, there is no mechanism of change, there's just an association of what is before and what is after.

Velocity, at the collision, instantaneously became acceleration. What caused the change from velocity to acceleration? The change here is of relations, not from additional elements acting as agents of change since we know all the same elements before the collision were still there after the collision.⁂ The change from velocity to acceleration can't come from the same elements working as a mechanism of cause. That is impossible for the following reason. First let's consider the simpler relation, distance. Distance is a measure of space along a line. It is clearly neither a mechanism nor an element, but a relation of two points or objects. Now consider velocity. Velocity is the rate something changes distance over time. When the baseball moves at a constant velocity toward the window, both the window and the baseball thinks he is at rest and the other is moving. If the cause of the change of distance is a mechanism, what object is the mechanism affecting? Is it affecting the ball and not the window, and therefore Galileo's relativity of motion is wrong? No. A mechanism cannot work without exerting a force, and there is no force on either item. Velocity is no more a mechanism or element than distance is. Now consider acceleration. When something is still or moves at a constant velocity in a straight line it has a certain inertia. Inertia is the resistance to change of velocity and direction and is an inherent relation of anything with mass with any other force. Acceleration is the change of velocity or direction. Nothing changes velocity on its own, it requires force—but force is the acceleration of mass. †

Acceleration only happens at the moment two or more velocities and directions are combined. This is a change of values. This change of values is what we call force, work, or acceleration. † † No element is working; you might say it is being worked upon, but this work is merely the *change* of the velocity or direction. Distance, velocity, and acceleration are all relations. ‡

Values and equations, i.e., elements associated by their relations to each other, are all that are needed to re-create experiments or predict events. Equations are determined by observing invariable patterns in nature. These are the laws of nature. There are no causes of these laws. It's not that the causes are hidden, but that it is absurd to even look for a cause when no information of this sort could possibly have practical bearing—all you need to know is the effect. This is what Peirce meant, in his paragraph on acceleration and force (at the end of Ch. II), by "there is nothing more to know."

To illustrate the identity of cause and effect, I'll trace the causal chain backwards from the break:

- The cause of the break is the flexing of a brittle window to the point of breakage, ∴ a window flexed to the breaking point is a broken window.
- The cause of the flex is the acceleration of only a portion of the window relative to other portions of the window, ∴ the flexing is the acceleration; the acceleration is the flexing.
- The cause of the acceleration/flexing is the collision of two elements, ∴ the acceleration/flexing is the collision.
- The cause of the collision is the ball and window's relation to each other, i.e., their direction and relative velocities, ∴ their direction and relative velocities is the collision.

Objection: I can conceive a cause before an effect, ex., a baseball traveling before it breaks the window, so I have valid separate conceptions of cause and effect.

Answer: First, the cause, as you conceive it, includes time which leads right into the broken window, so cannot be seperated from this effect.

Second, remember, a judgement of sensory effects into an object of conception is a mental action made to fulfill a need or desire. The judgement is made to be useful. § Your conception of the cause separate from the effect in this particular instance serves no purpose. You only separated this particular velocity+direction with this collision because you compared this experience with previous experiences which were similar. You've seen a baseball caught before a collision with a window, etc. Each incident is its own particular case. In your previous experience velocity+direction+time equalled the collision with the glove that caught it. In the present case, you imagined there was some usefulness to the separation—the

possibility of the ball being caught or deflected before the window. But in this case the complete parameters were set for the effect of a broken window to happen: ball+window+(their relation), so your purpose for the separation was imaginary.

Like you can't say "Matt getting cold caused the fire", you can't say "the baseball caused the broken window," because you have to include the relations, viz., velocity+direction+time. But, this situation is different than "Matt getting cold" because after Matt got cold many other elements were added into the event to lead up to the final effect of fire. In the baseball/window event, once the ball is in flight toward the window the only thing needed in this equation is time; with nothing taken away from the equation the collision happens. You can conceptually separate the cause and effect of the event as much as you can separate 2+3 and 5. (Again, 2 is the ball; 3 is the window; + is their relation; 5 is their new collective state.) But there is no practical difference between the two concepts (concept 2+3 and the concept 5), unless you imagine the possibility of someone catching the ball before it hits the window, which can be represented as 2+(3-1)=4. But that didn't happen, so the -1 is imaginary. You might think of the 2+3 as a cause of something in addition to the broken window, ex., the cause of somebody holding their breath while watching. (2+3)+1=6. This secondary judgement is valid but it doesn't invalidate the original equation, ball+window+(relative direction and velocity)+time=(broken window.) There's a 5 in the 6.

Any segment of time and space in the causal chain can be considered as a separate object, so when speaking accurately we must be as precise as possible about what we are referring to. All our practical conceptions are delineations of life, except perhaps trying to grasp the whole undelineated causal chain of events going back to the big bang (or before.) And it's impossible to perfectly define the delineations in life, i.e., to split time and space with an infinitely fine scalpel. So it can be very cumbersome sometimes to get our point across accurately—too often we throw in words from the tip of our tongue to fill the sentence, partially mismatching the subject and predicate, and confusion results. Ex. "Matt forgetting to bring his jacket caused the fire." And sometimes it's good enough for our roughly defined purpose. The level of accuracy in defining our statements must match the level of accuracy our purpose demands. The more accurate we get, the closer a cause and its effect refer our (past, present or potential) actions to the same objective thing. When being the utmost accurate, there is nothing in our senses or conceptual ability to separate cause and effect.

Objection: "Burning wood causes smoke" is always true, but you can't say "burning wood is smoke" because you can't reverse the equation to "Smoke is burning wood" because it is not always true. Smoke sometimes comes from burning bread. I also have a problem with the reversal of time the equation implies.

Answer: The problem here is with the universal, smoke. The nature of smoke coming from wood is different from smoke coming from burning bread, but we lump the two in one word,

smoke. If the cause is exclusive to the effect and always causes the effect, then the cause and effect are the same. That is, if only x causes y, and x always causes y, then x=y. This includes all particular cases and some general cases. The general rule "only force causes acceleration, and force always causes acceleration" should be put "force is acceleration, and vise versa." In the particular case "this burning wood caused this smoke," you can say "only this burning wood caused this smoke" since no other thing caused it, and you can say it always causes it since there is only one case and it happened. It can be equated "this burning wood=this smoke" and thus can be reversed allowing "this smoke caused this burning wood." This statement, however strange sounding, contradicts no facts available. The strangeness comes from your illusions of change taking time, which implies there is a mechanism of change. The wood that caused the smoke instantaneously changed to smoke. The flow of time, i.e., which came before and after, is not a factor since we are only focused on the single moment of change. In general, the word *cause* is used to point to the phenomenon of change from the perspective of what came before the change. The word *effect* is used to point to the phenomenon of change from the perspective of what came after the change. But they both point to the same phenomenon of change. (If this is still confusing re-read it after you have read chapter IV, and compare it with the strange but valid paradigms presented there.)

In every particular case, cause and effect can be equated. We use the words cause and effect to describe different paradigms of the same phenomenon.

IV. Various Alternative Paradigms

Often the only difference between things or ideas is our conceptual framework, which is a subjective difference.

Imagine a model of our solar system, one you might find in a grade school science class—a model with a base which has a motor, the sun sitting on top of the base, and planets, held in place by rods, which when the motor is turned on orbit the sun. If you hold the model steady by the base you will see the planets orbit the sun. Now, if you hold the model steady by the Earth, you will see the whole solar system move maladroitly around the Earth. While it is much more convoluted to explain the mechanics from the perspective of the latter situation, the model nonetheless works just fine. The difference between the ideas, "the Sun is the center of our universe," and "Earth is the center of our universe" has no practical bearing. The model in our science class didn't change; it was simply held in a different way. Copernicus only changed the way we view the solar system to a simpler picture, which made further developments in astronomy and astrophysics easier to discover, but it had no practical bearing on the veracity of the model. The way we think of an object helps us discover new things, but doesn't necessarily invalidate our old conception of the object.

Look carefully, the second figure is an exact copy of the first[5]:

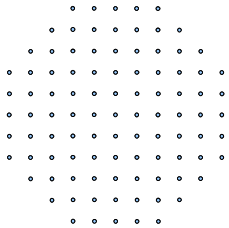

Fig.1

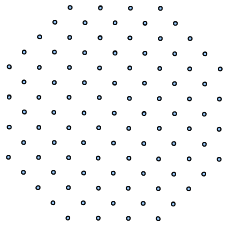

Fig.2

Kip Thorne, in Black Holes and Time Warps, wrote about the difference between Einstein's conception of curved spacetime and a conception of flat spacetime developed by later physicists for analyzing general relativity, (not to be confused with Newton's flat space.) Excerpts from Chapter 11, What is Reality:

> Is spacetime really curved? Isn't it conceivable that spacetime is actually flat, but the clocks and rulers with which we measure it...are actually rubbery. Might not even the most perfect of clocks slow down or speed up, and the most perfect of rulers shrink or expand, as we move them from point to point and change their orientations? Wouldn't such distortions of our clocks and rulers make a truly flat spacetime appear to be curved? Yes. ...
>
> What could possibly make the ruler shrink, when its orientation changes? Gravity, of course. ...
>
> As an exemplar, in the curved spacetime paradigm, the verbial picture of Einstein's field equations is the statement that "mass generates the curvature of spacetime." When translated into the language of flat spacetime paradigm, this field equation is described by the verbal picture "mass generates the gravitational field that governs the shrinkage of rulers and the dilation of the ticking of clocks." Although the two versions of the Einstein field equation are mathematically equivalent, their verbal pictures differ profoundly. ...
>
> What is the real, genuine truth? Is spacetime really flat...or is it curved? To a physicist like me this is an uninteresting question because it has no physical consequence. ... Moreover, physicists can and do use the two viewpoints interchangeably when trying to deduce the predictions of general relativity. ...
>
> The Newtonian paradigm of gravity, of course, is *not* equivalent to Einstein's curved spacetime paradigm; the two give different predictions for the outcomes of experiments.

Scientists today do use the Newtonian paradigm (model) when the level of accuracy it provides is good enough for their purpose, ex., when figuring out simple problems like the trajectory of an asteroid in our solar system. However if they need their result to be the most accurate possible they would have to take the time and use Einstein's field equations. When exploring the extremes of the universe, like the strong gravity of black holes and the trajectory of light from distant quasars, a slightly inaccurate model becomes unacceptable.

Thorne compared three different paradigms, all of which "look" different; two are very accurate and a third (Newton's) is good enough for some purposes. The important point is that while the two general relativity models look different, their predictive qualities are the exactly the same.

In case you didn't catch it, the dotted figures 1 and 2 are the same but one is tilted by 45°.

Let's look at an alternative paradigm of the quality *hardness*, with another excerpt from Peirce's article:

> [L]et us ask what we mean by calling a thing *hard*. Evidently that it will not be scratched by many other substances. The whole conception of this quality, as of every other, lies in its conceived effects. There is absolutely no difference between a hard thing and a soft thing so long as they are not brought to the test. Suppose, then, that a diamond could be crystallized in the midst of a cushion of soft cotton, and should remain there until it was finally burned up. Would it be false to say that that diamond was soft? This seems a foolish question, and would be so, in fact, except in the realm of logic. There such questions are often of the greatest utility as serving to bring logical principles into sharper relief than real discussions ever could. In studying logic we must not put them aside with hasty answers, but must consider them with attentive care, in order to make out the principles involved. We may, in the present case, modify our question, and ask what prevents us from saying that all hard bodies remain perfectly soft until they are touched, when their hardness increases with the pressure until they are scratched. Reflection will show that the reply is this: there would be no *falsity* in such modes of speech. They would involve a modification of our present usage of speech with regard to the words hard and soft, but not of their meanings. For they represent no fact to be different from what it is; only they involve arrangements of facts which would be exceedingly maladroit. This leads us to remark that the question of what would occur under circumstances which do not actually arise is not a question of fact, but only of the most perspicuous arrangement of them.

In the case of the hard bodies that are soft and only when touched increase their hardness,

this is similar to Thorne's "rubbery" rulers. While Peirce's paradigm is, as he said, "exceedingly maladroit" it is still perfectly viable, i.e., its predictive qualities are exactly the same as the alternative paradigm. Answering the two pragmatist's questions: The effects are the same and it works the same; and the only difference between them is our conceptual framework of them.

In the case of the diamond that was never touched, Peirce's question "Would it be false to say that that diamond was soft?" should be answered "No." If the diamond only becomes hard when touched then our diamond was in fact soft, because it was never touched. You could also say the question is moot because the idea of hardness or softness has no relevance to something that doesn't touch anything. You only know what the quality of hardness is by its effect, ex., it won't get scratched by a softer object. Absent the effect you don't know the quality. You could make an inference based on other qualities it has, ex., it shines, it has a jagged shape, so it probably also has the quality of hardness; but hardness means either that it will get hard when touched, or it is hard even before touched. Either way, if it touches something soft it won't get scratched, so there is effectively no difference between paradigms.

These alternative paradigms are far from elegant when our purposes are usual, but there could be unusual uses for these views making them very elegant for those purposes. Thorne wrote that the usual curved spacetime paradigm is, for ex., more amenable to the problems of determining if black holes are all perfectly spherical or not; and the alternative paradigm, flat spacetime with rubber rulers, is more amenable to problems of gravitational waves. Although both would yield the same results. Holding the model of the solar system by the earth is more amenable to seeing how planets appear in the earth's sky. Thinking of a diamond as soft until touched was a mental exercise to demonstrate a very strange paradigm matching observable reality just as well as it's normal opposite, a diamond that remains hard even when not touched. The word *cause* is used to point to the phenomenon of change from the perspective of what came before the change. The word *effect* is used to point to the phenomenon of change from the perspective of what came after the change. But they both point to the same phenomenon of change.

V. Theism vs. Atheism

When forming conceptions of objects and ideas at the extremes of nature, like black holes and sub-atomic space, there is little information for the non-physicist to grasp, so the concept will be a bit sketchy; but, it is decidedly impossible to conceptualize an object outside of nature, therefore the totality of effects we can experience which we might believe come from God must be in nature, or, the effect could be nature as a whole.

Take the third Peirce quote and substitute these words: *God* for *force; nature* for *acceleration;*

created for *causes*. Then we'll have the following:

~ Whether we ought to say that God is nature, or that he created nature, (or causes natural phenomena), is a mere question of propriety of language, which has no more to do with our real meaning than the difference between the French idiom *'Il fait froid'* and its English equivalent *'It is cold.'* ~

~ ...it [was] stated that we understand effects of God, but what God himself is we do not understand! This is simply a self-contradiction. The idea which the word God excites in our mind has no other function than to affect our actions, and these actions can have no reference to God otherwise than through His effects. Consequently, if we know what the effects of God are, we are acquainted with every fact which is implied in saying that God exists, and there would be nothing more to know. ~

Both theists and atheists refer their actions to the effects of God, i.e., nature. We must now see that God and nature are, for all practical purposes, synonyms. When their ideas are made clear, theists and atheists are in agreement about what God/nature is.

Objection: If the word God is a synonym for nature, then why do theists react toward their object differently than atheists? For example, theists pray to God, while atheists don't.

Answer: First, some people say they are reacting to God when in fact they are reacting to something completely subjective. Peirce, in How to Make Our Ideas Clear:

> One singular deception...which often occurs, is to mistake the sensation produced by our own unclearness of thought for a character of the object we are thinking. Instead of perceiving that the obscurity is purely subjective, we fancy that we contemplate a quality of the object which is essentially mysterious; and if our conception be afterward presented to us in a clear form we do not recognize it as the same, owing to the absence of the feeling of unintelligibility.

Second, just like people react differently when they see a p vs. d, they react differently to the ideas of creator vs. created. p and d are the same thing, the difference of reaction is according to learned social conventions rather than objective understanding. (What is a ɒ ?)

Nonetheless, it would be worth our while to give the reactions of theists and atheists the same analysis we give to any other object. What is praying, i.e., what are its effects? And how are these effects different from the effects of actions atheists take toward nature? Some examples: Atheists *admire* nature and often find themselves *wishing* (even out loud) nature will act in their favor. Compare praising God to admiring nature; asking God for favor to wishing nature acts in our favor. What is the practical difference?

Any practical difference between effects outside of one's mental state, ex., luck vs. God's answer to prayer, is certainly not demonstrable.

If the effects bear on us internally, like peace of mind or happiness, then of course you can

only wonder if there is a difference. Is the theist's peace from praying different from the atheist's who admires and wishes? The problem is that no single person can experience being a believer-in-God and a non-believer at the same time. It would have to be at the same time because time changes one's perspective and memory of experience. Nor can the theist say "I both pray and wish, so I know there is a difference between the atheist's peace and my peace," because his belief may very well cause the difference in himself. Ex., because he believes in prayer he may diminish his experience of what he considers *wishing* and *admiring* (perhaps because he separates his notions of prayer from wishing/admiring), whereas the atheist's wishes and admirations may remain un-diminished. There is no way to test for it. So no person can ever really know if there is a difference. A theist can't say he has more hope for the future, no matter how long. Where a theist may believe God will carry him into eternity, an atheist who feels a deep connection with nature may believe he will alway be with nature. Both can have hope. The theist believes he will be consciously with God forever. There are atheists who believe that consciousness is the very fabric of reality. An atheist who obviously believes that consciousness came to being without a god can easily believe in its continuation in another form after death. Some atheists believe consciousness is the warp and weft of reality; some believe consciousness is the warp and matter is the weft. Nobody has a clear conception of what comes after life. The specific images people imagine of the after-life differ wildly even within each group (atheists and theists.) The difference of effect of the different understandings is very much like the different effects people got from figures 1 vs. 2 from chapter IV, or from p vs. d.

It would be wrong to say the word *God* is a misnomer for *nature* because this would imply that the word *nature* refers our actions to a different object then what the word *God* refers our actions to. *God* and *nature* refer our actions to the same object.

The word *God* is not necessarily superfluous. Just as the alternative paradigms above were useful for alternative purposes, the paradigm that God created nature may be useful. For example, for some people this perspective may be more amenable to keeping spirits up when times are emotionally difficult, or for maintaining a charitable attitude even when wronged, etc. Alternatively, disregarding a cause of nature may be useful. For example, in situations when time is short, a person may find efficiency in his thoughts and actions where the additional idea of God would bog him down, perhaps causing too much deliberation, or anxiety, etc. Conversely, someone might find the idea of God useful for fueling their hatred toward people different then they, which would be useful for selfish purposes; and atheists might find the alternative paradigm useful for maintaining peace toward all others, which would be useful for civil development.

Even if an atheist or theist disregards the above examples and thinks the use of the word *god*, or disregard thereof, has all the added benefits of thinking a diamond is soft until touched, he

has to admit there is nothing illogical about either paradigm. They both refer to the same thing, only with different conceptual frameworks, or "verbal pictures," i.e., there is nothing objectively different about them.

The words *theism* and *atheism* should now refer to useful paradigms rather than static views. Like science models, they can be interchanged as found useful.

Notes

* When put to the pragmatist's test, intuition or any other source of knowledge comes from some combination of the above three steps to knowledge—it is nothing prior to or beyond these steps. Also, don't confuse automated biological function or instinct with knowledge—you didn't learn to beat your heart faster when you run, nor as a child did you learn to recoil after touching a hot stove.

** The idea that things are neither completely separate nor completely part of you is very apparent when considering how you learned you were a separate being from your mom. It was a slow learning process which, hopefully never feels completed. Even more so, the idea that you are different from what you used to be took even longer to understand, and is never completely justified.

‡ Imagine an intelligent being who after forming many habits runs out of problems. His life would run very predictably, following the same habits, much like a planet follows the laws of gravity and motion.

If intelligence is manifested in the ability to solve problems, then what would we think of a being that has absolutely no problems with life? We would think he is dumb as a rock!

If intelligence is manifested in the ability to realize that there are no problems, that ahimsa (in it's broadest sense, not just as it pertains to living things) is better than forcing your will on everything, then what would intelligent beings think of we people who are always scurrying to get things done? They would think we're dumb as... actually, they wouldn't be bothered by us.

*** The baseball's velocity is 70 m.p.h. relative to the window, but from its own perspective it is at rest, (discounting friction—every collision the ball has with a particle of air is a case of acceleration.) The window's velocity relative to the baseball is 70 m.p.h. but from its own perspective it is at rest. Right before impact each one thinks he is happily at rest. Velocity is neither an element nor a mechanism; like distance, it merely defines the relation between two objects.

⁂ Second Law of Thermodynamics. Also, $E=MC^2$ tells us that some mass transformed to energy. This too is an equation, not an explanation of a causal mechanism of the transformation. The change from mass to energy followed the same principle, viz., this being, that became.

† Force is the acceleration of mass and is measured by the formula force=mass×acceleration (f=ma).

†† A relation inextricable with f=ma is 'mass to velocity to energy' as formulated $E=MC^2$. Opposed accelerations will result in a transformation of mass to energy, some of which will be radiated as heat.

‡ Velocity is the changing of distance. Acceleration is the changing of velocity.

§ Something's use is relative to someone's needs and desires. If topology were our only concern, a piece of clay in the form of a coffee cup changed into the form of a doughnut would be no change at all. If material were our only concern, you could tear the clay to bits and separate the pieces by various distances, and since the same material is all there, there would be no change. The word *only* is used strictly. Any change that is not of topology in the first example, nor of material in the second example, would have no relevance to anything with consequence. That is why they would not be real changes. Anything that could possibly have an effect on us, directly or indirectly, and however slight, is of consequence and therefore real. People have a very biased view of the world—biased according to their needs and desires—but no person needs to separate the cause "baseball traveling" and the effect "broken window" in this particular case, as I go on to explain. Once the baseball is traveling the window is as good as broken. Literally.

1. Charles Sanders Peirce, in *Pragmatism as the Logic of Abduction*, in *The Essential Peirce, Vol. II*, pg. 226.

2. Th. Stcherbatsky in *Buddhist Logic*. Vol. I, pg. 79-81. After arguing that "All things without exception are nothing but strings of momentary events." ..."like a cinema," he later states, "But a thing cannot be the object of a purposive action and cannot be efficient otherwise than by its last moment. Its former moments cannot overlap the moment of efficiency in order to produce the effect."

   I used the word "at" instead of the phrase "immediately before" in the sentence "100% of what is needed to produce the effect is there at the moment of the effect" because it is absurd to think you can place two points on a line with no space in between. There is no such thing as "the moment immediately before." This is in line with the idea that cause and effect are identical in the real world, and represented to us by two different paradigms, viz., cause and effect.

3. From the glossary of *Black Holes and Time Warps* by Kip Thorne: "Planck–Wheeler length, area, and time: Quantities associated with the laws of quantum gravity. ... The Planck–Wheeler length...is the length below which space as we know it ceases to exist and becomes quantum foam. The Planck–Wheeler time...is the shortest time interval that can exist; if two events are separated by less than this, one cannot say which comes before and which after."...

4. *The Conception of Buddhist Nirvana* by Th. Stcherbatsky, pg 87-192, translates Candrakirti's treatise on Nagarjuna's verses explaining the Buddha's use of the word "pratitya samutpada," which can be interpreted as *causality; this being, that becomes; interdependent origination; relative existence; emptiness;* and more.

   To Buddhists, understanding the phenomenon of change is as important as it gets. From ibid, pg. 90, According to Candrakirti, it is written in Buddhist Scripture: "O Brethren, I will teach you the Dependent Origination of everything. Those who will get an insight into it, will have grasped the teaching of the Buddha." An important aspect of change is that everything throughout space and time is connected by the causal chain. The implications they draw from this are stunning. If you consider the fact that change takes no time and happens at every division of space, and every thing throughout time and space is connected, then the corollary is this: One thing is everything, and everything is any one thing. This train of thought is useless for mundane (meaning isolated) matters, but is useful for propping up loftier thoughts like respect for others and peace, etc. Of course, nothing is isolated, and therefore nothing is mundane.

5. Figures 1 and 2 are taken from Charles Sanders Peirce's How to Make Our Ideas Clear.